

# The Cladocera (Crustacea) of New Caledonia

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Thirteen species are reported with only *Chydorus eurynotus* and *Simocephalus exspinosus australiensis* common. A new subspecies *Latonopsis brehmi dedeckkeri* is erected while *Disphanosoma sarsi* var *novae-caledoniae* is synonymized with *D. sarsi*. The species present are mainly common cosmopolitan or circumtropical forms or have Australian affinities.

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## INTRODUCTION

The cladoceran fauna of New Caledonia was documented by Stingelin in 1915. He examined collections from two localities and recorded 7 species, namely, *Diaphanosoma sarsi* Richard var. *novae-caledoniae* (new variety), *Daphnia carinata* King forma *mirabilis* (new form), *Ceriodaphnia rigaudi* Richard, *Simocephalus acutirostratus* (King), *S. australiensis* (Dana), *Ilyocryptus halyi* Brady var. *longiremisi* (Sars) and *Alonella* (syn. *Alona*) *karua* (King).

In July-August 1981 Patrick DeDecker collected widely on the island in order to survey its lacustrine fauna. His collections were made available to the author for study, resulting in the identification of 12 species from 14 of the localities. Full details of the nomenclature and location of the collecting sites will be given in DeDecker (in prep); for the present his locality numbers are used in the text, with brief nomenclature given in the Appendix.

Microslides of many of the species have been deposited in the Australian Museum under registration numbers P 33799 to P 33815. In the comments that follow only brief synonymies are given; more extensive ones are given in Smirnov and Timms (1983) and/or in the last reference of each synonymy.

## SPECIES LIST AND COMMENTS

### *Latonopsis brehmi dedeckkeri* new subspecies

(Fig. 1)

**Localities:** 2,5,19.

**Slides:** Holotype ♀ P 33799; Paratype ♀♀ P 33800; P 33801.

**Specimens:** ♀ ♀ P 33815 — 43 specimens in spirit.

**Description:** The New Caledonian material assigned to this new subspecies of *Latonopsis brehmi* Petkovski differs only slightly from the nominate form. The most obvious differences are: (i) the basal segment of the endopodite of the antenna is longer (3x width instead of 2x width), (ii) the proximal segment of the endopodite of the antenna has 6-8 setae instead of 8-10, (iii) there are 9-12 fairly evenly spaced anal teeth rather than 13-16 with a few apparently duplicated so that the teeth are unevenly arranged and (iv) on the lower margin of the valve there are 10-12 denticles in each cluster between the setae instead of 3-5.

**Length:** 2.1mm.

**Type Locality:** Lac Yaté, New Caledonia, 22°09'S, 167°00'E.

**Comments:** Originally *L. brehmi* was described from two localities in Australia, one (now drained) in eastern N.S.W. and the other in southwestern W.A. It has since been

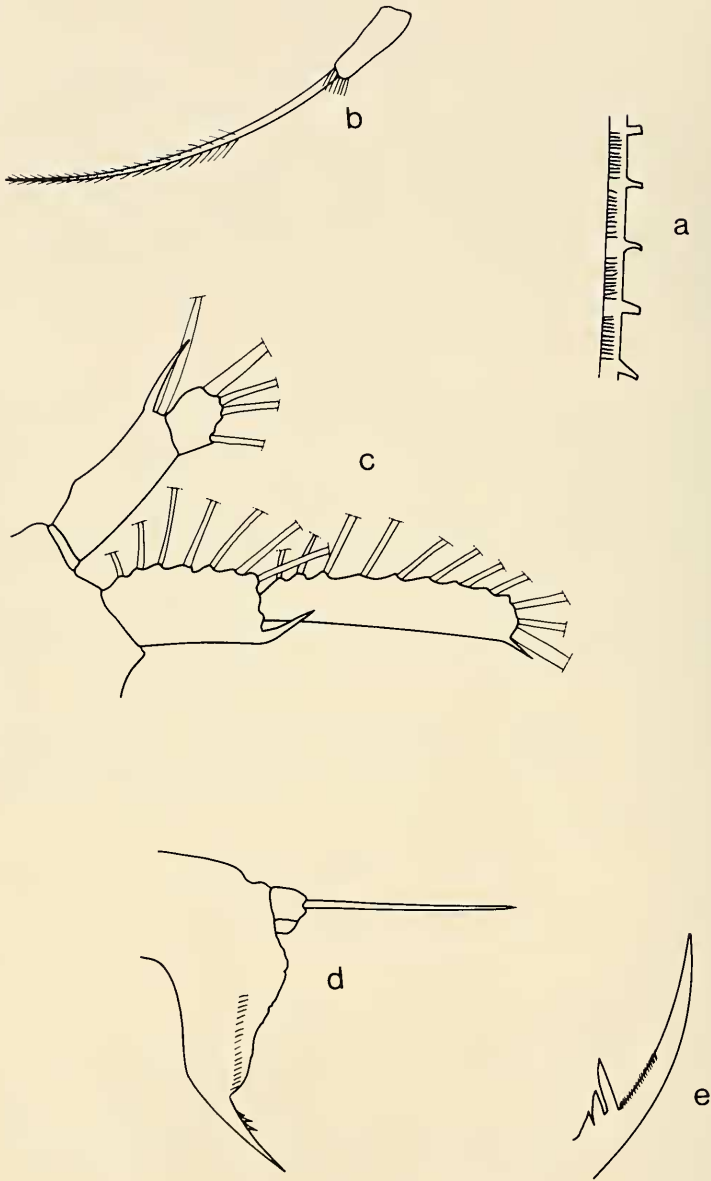


Fig. 1. *Latonopsis brehmi* ♀. a — carapace edge, b — antennae I, c — antennae II, d — postabdomen, e — claw.

found in a few localities elsewhere in Australia — southwestern W.A. (R. Shiel, personal communication), Kakadu National Park, N.T. and Cape York (author, unpublished data). The extent of variability of taxonomic characters in these isolated populations is

unknown at present, so the author's approach of erecting a new subspecies for the New Caledonian form is tentative, but conservative.

**Ecology:** pH range 6.4-7.8, conductivity range 4.5-75  $\mu\text{Scm}^{-1}$ .

*Diaphanosoma sarsi* Richard 1894

*Diaphanosoma sarsi* Richard 1894: 568, figs 4-5.

*Diaphanosoma sarsi* var *novae-caledoniae* Stingelin 1915: 198, 199, figs 1-3.

*Diaphanosoma sarsi*, Korovchinsky 1981: 825-827, fig. 8.

**Locality:** 29.

**Slide:** P 33802.

**Comments:** Stingelin recorded *D. sarsi* from New Caledonia but maintained that his specimens were slightly different, so he named his form *D. sarsi novae-caledoniae*. The only characteristic feature he noted was that his specimens had 20-25 denticles on the lower part of the posterior margin of the valves, whereas in *D. sarsi sensu stricto* there are 18-22. Both the specimen on slide P 33802 and another in the author's collection have 17-21 spines and in all other features are *D. sarsi*. Significantly Stingelin's figure shows only 22 enlarged denticles though they are followed by a few small ones. In that distal denticles in this row lack clear size separation, it is possible Stingelin's count was excessive. Even in the absence of type material for checking, it seems reasonable that his specimens were indeed *D. sarsi sensu stricto*.

**Length:** 1.1mm.

**Ecology:** pH 8.4, conductivity 550  $\mu\text{Scm}^{-1}$ .

*Alonella clathratula* Sars 1896

(Fig. 2)

*Alonella clathratula* Sars 1896: 43-45, pl. 6, figs 7-8.

*Alonella excisa* var *clathratula*, Smirnov 1971: 260-263, fig. 265.

*Alonella clathratula*, Smirnov and Timms 1983: 26, fig. 26.

**Locality:** 25.

**Slide:** P 33803.

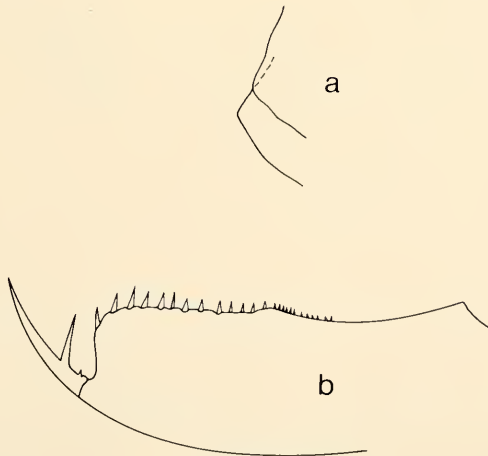


Fig. 2. *Alonella clathratula* ♀. a — ventroposterior corner of carapace, b — postabdomen.

**Comment:** Both the specimen on slide P 33803 and one in the author's collection have relatively elongated valves and postabdomen while the posteroventral corner of the valve is rounded with little indication of an indentation above it. Hence they have the identifying feature of *clathratula* (Smirnov and Timms, 1983). However it is possible that this form is but a subspecies of *excisa* as maintained by Delachaux (1919) and Smirnov (1971). A detailed study is therefore needed.

**Length:** 0.42mm.

**Ecology:** pH 7.6, conductivity 126  $\mu\text{Scm}^{-1}$ .

*Chydorus eurynotus* Sars 1901

*Chydorus eurynotus* Sars 1901: 70, pl. II, figs 3a-c.

*Chydorus eurynotus*, Smirnov 1971: 306-308, figs 337-342.

**Localities:** 2, 8, 19, 25, 27, 29.

**Slide:** P 33804.

**Comments:** *Chydorus eurynotus* is the most often encountered cladoceran in New Caledonia. Of the various subspecies listed by Smirnov (1971) the New Caledonian species belongs to the nominate one.

**Length:** 0.34mm.

**Ecology:** pH range 6.4-8.4, conductivity range 4.5-550  $\mu\text{Scm}^{-1}$ .

*Ephemeroporus* cf. *barroisi* (Richard, 1894)

(Fig. 3)

*Pleuroxus barroisi* Richard 1894: 375-377, figs 7-12.

*Chydorus barroisi*, Sars 1895: 75-78, p14, figs 9-13.

*Chydorus barroisi*, Smirnov 1971: 198-301, figs 328-332.

*Ephemeroporus barroisi*, Frey 1982: 234-237.

**Localities:** 2, 7, 19.

**Slide:** P 33805.

**Comments:** The specimen on slide P 33805 is not well presented, but there is little doubt it is a member of the *barroisi* complex (*sensu* Frey, 1982), for there are four teeth on



Fig. 3. *Ephemeroporus barroisi* ♀. **a** — labrum, **b** — ventroposterior corner of carapace.

the labrum, a spine at the ventroposterior corner of the valve and the three most proximal denticles on the postabdomen are the longest. Specific allocation within the complex must await further study of the *barroisi* group (see Frey, 1982).

**Length:** 0.28mm.

**Ecology:** pH range 6.4-7.8, conductivity range 4.5-78  $\mu\text{Scm}^{-1}$ .

*Dunhevedia crassa* King 1853

*Dunhevedia crassa* King 1853b: 261, pl. VIIF.

*Dunhevedia crassa*, Smirnov 1971: 319-320, figs 358-360.

**Locality:** 30.

**Slide:** P 33806.

**Comments:** *Dunhevedia crassa* is a common cosmopolitan species although it is apparently rare in New Caledonia. Of the various subspecies listed by Smirnov (1971), the New Caledonian specimens belong to the nominate one.

**Length:** 0.51mm.

**Ecology:** pH 7.6, conductivity 590  $\mu\text{Scm}^{-1}$ .

*Alona rectangula* Sars 1862 *sensu lato*

(Fig. 4)

*Alona rectangula* Sars 1862: 160.

*Alona rectangula*, Smirnov 1971: 346-348, figs 391-405.

**Locality:** 32.

**Slide:** P 33807.

**Comments:** *Alona rectangula*, an ill-defined species which groups many described subspecies, is probably a species complex and is in need of revision (Smirnov, 1971 and personal communication). The specimen on slide P 33807 is tentatively designated as

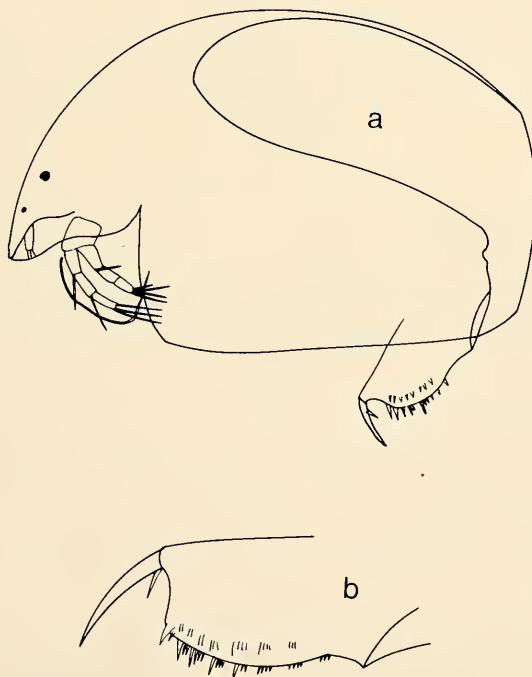


Fig. 4. *Alona rectangula* ♀. a — lateral view of whole animal, b — postabdomen.

*A. rectangula rectangula*, a form recorded in nearby Australia (Smirnov and Timms, 1983) but not New Zealand (Chapman and Lewis, 1976). Other forms of *A. rectangula* are common in both Australia and New Zealand (op. cit.).

**Length:** 0.26mm.

**Ecology:** pH 8.6, conductivity 175  $\mu\text{Scm}^{-1}$ .

***Biapertura karua* (King 1853)**

(Fig. 5)

*Alona karua* King 1853b: 260, pl. VIII.

*Biapertura karua*, Smirnov 1971: 479-480, figs 600-603.

**Localities:** 28, 29.

**Slide:** P 33808.

**Comments:** *Biapertura karua* is a common cosmopolitan species between 40° N and 40° S (Smirnov, 1971) and is one of the few species previously recorded for New Caledonia by

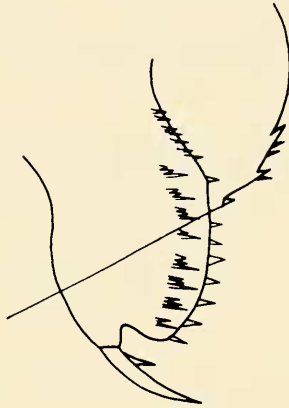


Fig. 5. *Alona karua* ♀. Ventroposterior corner of valve and postabdomen.

Stingelin (as *Alonella karua*). Some authors do not recognize Smirnov's erection of the genus *Biapertura* and so use the name *Alona karua*.

**Length:** 0.28mm.

**Ecology:** pH 8.0-8.4, conductivity 550  $\mu\text{Scm}^{-1}$ .

***Biapertura macrocopa* (Sars 1895)**

(Fig. 6)

*Alona macrocopa* Sars 1895: 20-23, pl. III, figs 11-15.

*Biapertura macrocopa*, Smirnov and Timms, 1983: 62, 63, figs 73, 74.

**Locality:** 25.

**Slide:** P 33809.

**Comments:** Although this species is described inadequately, the specimen on slide P 33809 has the diagnostic features given by Sars (1895) and Smirnov and Timms (1983), namely, the antenna has spines 1-0-1 / 1-1-1 with those at the distal end of the first and second exopodite segments being noticeably elongated. The postabdomen also is characteristic (Timms, in prep.), in that it is short with a rounded distal part bearing 5-6 larger anal denticles followed anteriorly by numerous slender ones. There are also about

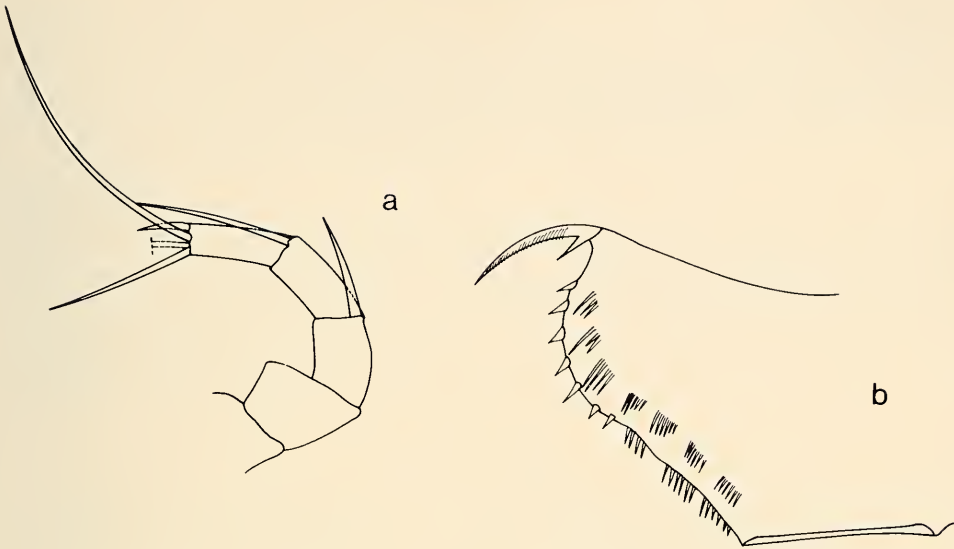


Fig. 6. *Alona macrocopa* ♀. a — antennae II exopodite, b — postabdomen.

7 lateral fascicules with the most distal ones having an enlarged seta reaching the edge of the postabdomen.

*Biapertura macrocopa* (syn = *Alona macrocopa*, see earlier comment) is basically an Australian species, being mainly found in northern areas (Smirnov and Timms 1983; Timms, in prep.), but it also occurs rarely in N.Z. (Sars, 1895) (Chapman and Lewis, 1976). Its presence in New Caledonia, located between Australia and New Zealand, is therefore not surprising.

**Length:** 0.34mm.

**Ecology:** pH 7.6, conductivity 126  $\mu\text{Scm}^{-1}$ .

***Macrothrix spinosa* King 1853**

*Macrothrix spinosa* King 1853b: 256, pl. VIF.

*Macrothrix spinosa*, Smirnov 1976: 73-76, figs 41-44.

**Locality:** 30.

**Slide:** P 33810.

**Comments:** The characteristics of the specimen on slide P 33810 agree with those for this common cosmopolitan species.

**Length:** 0.48mm.

**Ecology:** pH 7.6, conductivity 590  $\mu\text{Scm}^{-1}$ .

***Daphnia cephalata* King 1853**

(Fig. 7)

*Daphnia carinata* var. *cephalata* King 1853a: 254, pl. 6, fig. B.

*Daphnia cephalata* Hebert 1977: 385-388, figs 51-62.

**Localities:** 8, 30.

**Slides:** P 33811.

**Comments:** The taxonomy of *Daphnia* in Australia is in a confused state. Hebert's (1977) erection of many new species and the resurrection of others seems to be invalidated by the unpublished isozyme work of John Benzie (personal communication) which at

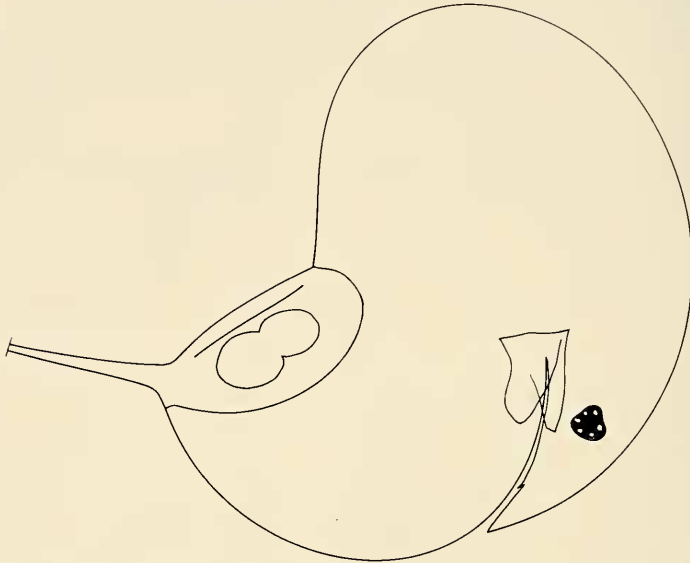


Fig. 7. *Daphnia cephalata* ♀. Lateral view of whole animal.

present suggests that most of Hebert's species are morphs of *D. carinata*. However, the specimens from New Caledonia comfortably fit Hebert's (1977) description of *D. cephalata*. A further complication occurs by trying to determine the taxonomic status of Stingelin's *D. carinata* form *mirabilis* which he described from New Caledonia. Hebert (1977) suggests it is similar to *D. longicephala*. A study of the figured specimen indicates it is *D. carinata* while the present finding of only *D. cephalata* on New Caledonia points to both species being present or to a possible synonymy. The situation cannot be resolved until J. Benzie's work is published.

**Length:** 4.2mm (excluding tail spine).

**Ecology:** pH 7.6, conductivity range 215-590  $\mu\text{Scm}^{-1}$ .

***Simocephalus exspinosus australiensis* (Dana, 1852)**

*Daphnia australiensis* Dana 1853: 1271-1272, pl. 89, fig. 4.

*Simocephalus australiensis*, Sars 1888: 15-25, pl. 2, figs 1-5.

*Simocephalus exspinosus australiensis*, Dumont in Smirnov and Timms 1983: 104, pl. 1.

**Localities:** 20, 31, 32, 33.

**Slide:** P 33813.

**Comments:** Stingelin (1915) recorded this species as *S. australiensis* (Dana), but Dumont in Smirnov and Timms (1983) considered it a subspecies of the cosmopolitan *S. exspinosus*. The *australiensis* form is distinguishable from other forms of *exspinosus* by having unequal triangular spines in the pecten on the postabdominal claw.



**Length:** 1.6mm.

**Ecology:** pH range 6.6-9.4, conductivity range 38-500  $\mu\text{Scm}^{-1}$ .

*Simocephalus acutirostratus* (King, 1853)

*Simocephalus elisabethae* var *acuti-rostrata* King 1853b: 254, pl. VIC.

*Simocephalus acutirostratus*, Sars 1888: 67.

**Locality:** 30.

**Slide:** P 33814.

**Comments:** Although the specimen on slide P 33814 is immature, it displays the typical characteristics of *S. acutirostris*, namely a pointed anterior part of the head, ocellus rhomboidal and a broad postabdomen with two deep embayments. Stingelin (1915) also recorded this species from New Caledonia.

**Length:** 1.9mm.

**Ecology:** pH 7.6, conductivity 590  $\mu\text{Scm}^{-1}$ .

#### DISCUSSION

Seven species were reported by Stingelin (1915) and 13 in this study, with 5 common to both, so that altogether 15 species of Cladocera are now known for New Caledonia. The Sididae are represented by 2 species (*Diaphanosoma sarsi*, *Latonopsis brehmi dedeckkeri*), the Chydoridae by 8 species (*Alonella clathratula*, *Chydorus eurynotus*, *Ephemeroporus* cf. *barroisi*, *Dunhevedia crassa*, *Alona rectangula*, *Biapertura karua* and *B. macrocopa*), the Macrothricidae by 2 species (*Ilyocryptus hayli* var *longiremis* = synonym *I. sordidus* and *Macrothrix spinosa*) and the Daphniidae by 4 species [*Daphnia cephalata*, *Simocephalus acutirostratus*, *S. exspinosus australiensis* and *Ceriodaphnia riguadi* (possibly synonymous with *C. cornuta*)]. The families Bosminidae and Moinidae, common in nearby Australia, remain unrecorded.

The most common species are *Chydorus eurynotus* and *Simocephalus exspinosus australiensis*. Four more (*Latonopsis brehmi dedeckkeri*, *Ephemeroporus* cf. *barroisi*, *Biapertura karua*, *Daphnia cephalata*) could be regarded as reasonably common, but the remainder seem to be uncommon, as only one or a few specimens were found in just one of the present 14 collections or in one of Stingelin's collections.

Many of the species occurring in New Caledonia generally are regarded as being common cosmopolitan or circumtropical forms. Examples include *Diaphanosoma sarsi*, *Chydorus eurynotus*, *Ephemeroporus* cf. *barroisi*, *Dunhevedia crassa*, *Alona rectangula*, *Biapertura karua*, and *Macrothrix spinosa*. A few have more limited distribution [e.g. *Daphnia cephalata* ranges from India to Australia to Argentina (Hebert, 1977)] or are not so common worldwide e.g. *Alona clathratula*, *Ilyocryptus sordidus*. The remaining 4 species have Australian affinities. New Caledonia is the only record outside Australia for *S. acutirostratus* and is the first record outside Australia for *Latonopsis brehmi*, and *Simocephalus exspinosus australiensis*.

Probably most, if not all, of the species of Cladocera in New Caledonia dispersed from Australia 1200km to the west, or less likely from New Guinea further away to the northwest. It is significant then that there are mainly common cosmopolitan and circumtropical species plus a few species of Australian affinities present. This is because to reach New Caledonia, a cladoceran needs the good dispersal powers widespread species must have, or otherwise originate nearby. Other islands of the Pacific east of New Caledonia can be expected to have even fewer species because of their smaller size and greater distance from continental Australia (MacArthur and Wilson 1967). Unfortunately most have not been explored for Cladocera so that not much more information is available than when Stingelin (1915) examined the subject. Limited data

(Dana, 1852; C. H. Fernando, personal communication) for Fiji which is somewhat smaller (10400 km<sup>2</sup>), than New Caledonia (16700 km<sup>2</sup>) and 1100 km further east, indicate a cladoceran fauna of more than 5 species (including *Diaphanosoma sarsi*, *Alona davidi*, *Biapertura karua* and *Moina micrura*, all cosmopolitan or circumtropical species). The main island of Tahiti (area = 1040 km<sup>2</sup>, 6000 km east of Australia) has just one species recorded, a form of *Chydorus sphaericus sensu lato* (Timms, unpublished data).

#### ACKNOWLEDGEMENTS

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## APPENDIX

List of localities in New Caledonia sampled by P. De Deckker which contain Cladocera.  
De Deckker's original numbers are retained.

- NC 2 Lac Yaté, westernmost side. 31-vii-1981.
- NC 5 Lac Yaté, near dam wall. 31-vii-1981.
- NC 7 Floodplain of 'Rivière des Lacs'. 31-vii-1981.
- NC 8 Pond on autoroute between Tontouta and Noumea. 1-viii-1981.
- NC 19 Lac en Y. 2-viii-1981.
- NC 20 Small dam on property near Nakele. 4-viii-1981.
- NC 25 Water reservoir for Noumea, near dam wall. 5-viii-1981.
- NC 27 Pool near La Dumbea River. 8-viii-1981.
- NC 28 Swamp on southern entrance to Bouloupari. 8-viii-1981.
- NC 29 Pond north of Bouloupari. 8-viii-1981.
- NC 30 Dam on farm on road to La Foa. 8-viii-1981.
- NC 31 Swamp at Naina. 8-viii-1981.
- NC 32 Duck dam near La Foa. 8-viii-1981.
- NC 33 Drain on autoroute between Tontouta and Noumea. 8-viii-1981.